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Exercise - I (Conceptual Questions) Build Up Your Understanding

OXIDATION NUMBER

1. In $[Ni(CO)_4]$, the oxidation state of Ni is :
(1) 4 (2) 0 (3) 2 (4) 8

2. The oxidation number of nitrogen in NH_2OH is:
(1) 0 (2) +1 (3) –1 (4) –2

3. Of the following elements, which one has the same oxidation state in all of its compounds ?
(1) Hydrogen (2) Fluorine
(3) Carbon (4) Oxygen

4. Oxidation number of fluorine in OF_2 is :
(1) +1 (2) +2 (3) –1 (4) –2

5. The oxidation number of C in CH_4, CH_3Cl, CH_2Cl_2, $CHCl_3$ and CCl_4 are respectively :
(1) +4, +2, 0, –2, –4
(2) +2, +4, 0, –4, –2
(3) –4, –2, 0, +2, +4
(4) –2, –4, 0, +4,. +2

6. Phosphorus has the oxidation state of +3 in :
(1) Ortho phosphoric acid
(2) Phosphorus acid
(3) Meta phosphoric acid
(4) Pyrophosphoric acid

7. Oxidation state of oxygen in hydrogen peroxide is
(1) –1 (2) +1 (3) 0 (4) –2

8. Which one of the following statements is not correct?
(1) Oxidation state of S in $(NH_4)_2S_2O_8$ is +6
(2) Oxidation number of Os in OsO_4 is +8
(3) Oxidation state of S in H_2SO_5 is +8
(4) Oxidation number of O in KO_2 is $-\frac{1}{2}$

9. Which of the following shows highest oxidation number in combined state :
(1) Os (2) Ru
(3) Both (1) and (2) (4) None

10. Oxidation number of sodium in sodium amalgam(Na-Hg) is :
(1) +2 (2) +1 (3) –3 (4) Zero

11. Oxidation number of C in HNC is :
(1) +2 (2) –3 (3) +3 (4) Zero

12. Oxidation number of Fe in $Fe_{0.94}O$ is :
(1) 200 (2) 200/94
(3) 94/200 (4) None

13. Oxidation number of carbon in carbon suboxide (C_3O_2) is :
(1) $\frac{+2}{3}$ (2) $\frac{+4}{3}$ (3) +4 (4) $\frac{-4}{3}$

14. Oxidation number of sulphur in $Na_2S_2O_3$ would be :-
(1) +2 (2) +4 (3) –2 (4) 0

15. Two oxidation states for chlorine are found in the compound :
(1) $CaOCl_2$ (2) KCl (3) $KClO_3$ (4) Cl_2O_7

16. –1/3 oxidation state of nitrogen will be obtained in case of :
(1) Ammonia (NH_3)
(2) Hydrazoic acid (N_3H)
(3) Nitric oxide (NO)
(4) Nitrous oxide (N_2O)

17. Compound $YBa_2Cu_3O_7$ is a super conductor. The O.N. of the copper in the compound will be: [O. No. of Y=+3]
(1) +7/3 (2) zero (3) +2 (4) +1

18. The oxidation state of iodine in $H_4IO_6^-$ is :-
(1) +7 (2) –1 (3) +5 (4) +1

19. Amongst the following, identify the species with an atom in + 6 oxidation state:-
(1) MnO_4^- (2) $Cr(CN)_6^{3-}$
(3) NiF_6^{2-} (4) CrO_2Cl_2

20. The oxidation state of + 1 for phosphorous is found in:-
(1) Phosphorous acid (H_3PO_3)
(2) Orthophosphoric acid (H_3PO_4)
(3) Hypo phosphorous acid (H_3PO_2)
(4) Hypo phosphoric acid ($H_4P_2O_6$)

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21. In which of the following compounds iron has lowest oxidation state:-
(1) $FeSO_4(NH_4)_2SO_4.6H_2$
(2) $K_4[Fe(CN)_6]$
(3) $[Fe(CO)_5]$
(4) $Fe_{0.94}O$

22. Select the compound in which the oxidation number of oxygen is –1:-
(1) H_2O (2) O_2F_2 (3) Na_2O (4) BaO_2

23. Match List - I (compound) with list - II (Oxidation state of N) and select the correct answer using the codes given below the list:-

List - I	List-II
(A) KNO_3	(a) – 1/3
(B) HNO_2	(b) – 3
(C) NH_4Cl	(c) 0
(D) NaN_3	(d) + 3
	(e) + 5

Codes are:-

	A	B	C	D
(1)	e	d	b	a
(2)	e	b	d	a
(3)	d	e	a	c
(4)	b	c	d	e

24. In which of the following pair, oxidation number of Fe is same :-
(1) $K_3[Fe(CN)_6]$, Fe_2O_3
(2) $Fe(CO)_5$, Fe_2O_3
(3) Fe_2O_3, FeO
(4) $Fe_2(SO_4)_3$, $K_4[Fe(CN)_6]$

25. In the conversion of Br_2 to BrO_3^-, the oxidation state of bromine changes from :-
(1) 0 to 5 (2) 1 to 5
(3) 0 to –3 (4) 2 to 5

26. The sum of oxidation states of sulphur in $H_2S_2O_8$ is :-
(1) +2 (2) +6 (3) +7 (4) +12

27. In which of the following compounds of Cr, the oxidation number of Cr is not +6 :-
(1) CrO_3 (2) CrO_2Cl_2
(3) Cr_2O_3 (4) $K_2Cr_2O_7$

28. Oxidation state of cobalt in $[Co(NH_3)_4(H_2O)Cl]SO_4$ is
(1) 0 (2) +4 (3) –2 (4) +3

29. Oxidation number of carbon in graphite is :-
(1) Zero (2) +1 (3) +4 (4) +2

30. Oxidation number of 'N' in N_3H (hydrazoic acid) is :-
(1) $-\frac{1}{3}$ (2) –3
(3) +3 (4) $+\frac{2}{3}$

31. Which of the following doesn't have +5 oxidation state of phosphorus ?
(1) Phosphorus acid (H_3PO_3)
(2) Orthophosphoric acid (H_3PO_4)
(3) Meta phosphoric acid (HPO_3)
(4) Pyro phosphoric acid ($H_4P_2O_7$)

32. The oxidation number of arsenic atom in H_3AsO_4 is :-
(1) –1 (2) –3 (3) +3 (4) +5

33. In substance $Mg(HXO_3)$, the oxidation number of X is :-
(1) 0 (2) +2 (3) +3 (4) +4

34. The oxidation number of phosphorus in PH_4^+, PO_2^{3-}, PO_4^{3-} and PO_3^{3-} are respectively :–
(1) –3, +1, +3, +5 (2) –3, +3, +5, +1
(3) +3, –3, +5, +1 (4) –3, +1, +5, +3

35. Which of the following compounds are arranged in increasing oxidation number of S :–
(1) H_2SO_3, H_2S, H_2SO_4, $H_2S_2O_3$
(2) $H_2S_2O_3$, H_2SO_3, H_2S, H_2SO_4
(3) H_2S, H_2SO_3, H_2SO_4, $H_2S_2O_3$
(4) H_2S, $H_2S_2O_3$, H_2SO_3, H_2SO_4

36. Iodine shows the highest oxidation state in the compound :–
(1) KI (2) KI_3 (3) IF_5 (4) KIO_4

37. The sum of the oxidation states of all the carbon atoms present in the compound C_6H_5CHO is :
(1) –4 (2) 3 (3) + 5 (4) – 4/7

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APPLICATIONS OF REDOX REACTIONS

38. A reducing agent is a substance which can :
(1) Accept electrons
(2) Donate electrons
(3) Accept protons
(4) Donate protons

39. The reaction $H_2S + H_2O_2 \rightarrow S + 2H_2O$ manifests :
(1) Oxidising action of H_2O_2
(2) Reducing nature of H_2O_2
(3) Acidic nature of H_2O_2
(4) Alkaline nature of H_2O_2

40. If an element is in its lowest oxidation state, under proper conditions it can act as :
(1) Reducing agent
(2) An oxidising agent
(3) Oxidising as well as reducing agent
(4) Neither oxidising nor reducing agent

41. In a reaction of
H_2O (steam) + C (red hot) $\rightarrow$ CO + H_2
(1) H_2O is the reducing agent
(2) H_2O is the oxidising agent
(3) Carbon is the oxidising agent
(4) Oxidation-reduction does not occur

42. The compound that can work both as an oxidising as well as reducing agent is :
(1) $KMnO_4$ (2) H_2O_2
(3) $Fe_2(SO_4)_3$ (4) $K_2Cr_2O_7$

43. HNO_2 acts as an oxidant with which one of the following reagent:-
(1) $KMnO_4$ (2) H_2S
(3) $K_2Cr_2O_7$ (4) Br_2

44. In which of the following reaction H_2O_2 acts as reducing agent :-
(1) $2FeCl_2 + 2HCl + H_2O_2 \rightarrow 2FeCl_3 + 2H_2O$
(2) $Cl_2 + H_2O_2 \rightarrow 2HCl + O_2$
(3) $2HI + H_2O_2 \rightarrow 2H_2O + I_2$
(4) $H_2SO_3 + H_2O_2 \rightarrow H_2SO_4 + H_2O$

45. When H_2 reacts with Na, it acts as :-
(1) Oxidising agent
(2) Reducing agent
(3) Both
(4) Cannot be predicted

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46. In the course of a chemical reaction an oxidant –
(1) Loses electron
(2) Gains electron
(3) Both loses and gain electrons
(4) Electron change does not occur

47. In the reaction:-
$C + 4HNO_3 \rightarrow CO_2 + 2H_2O + 4NO_2$
HNO_3 acts as :–
(1) An oxidising agent (2) An acid
(3) A reducing agent (4) A base

48. A compound contains atoms A, B and C. The oxidation number of A is +2, of B is +5 and of C is –2. The possible formula of the compound is :
(1) ABC_2 (2) $B_2(AC_3)_2$
(3) $A_3(BC_4)_2$ (4) $A_3(B_4C)_2$

49. Equivalent weight of N_2 in the change $N_2 \rightarrow NH_3$ is
(1) $\frac{28}{6}$ (2) 28 (3) $\frac{28}{2}$ (4) $\frac{28}{3}$

50. Equivalent weight of NH_3 in the change $N_2 \rightarrow NH_3$ is :
(1) $\frac{17}{6}$ (2) 17 (3) $\frac{17}{2}$ (4) $\frac{17}{3}$

51. In the reaction, $2S_2O_3^{2-} + I_2 \rightarrow S_4O_6^{2-} + 2I^-$, the eq. wt. of $Na_2S_2O_3$ is equal to its :
(1) Mol. wt. (2) Mol. wt./2
(3) 2 x Mol. wt. (4) Mol. wt./6

52. In the reaction, $VO + Fe_2O_3 \rightarrow FeO + V_2O_5$, the eq. wt. of V_2O_5 is equal to its :
(1) Mol. wt. (2) Mol. wt./8
(3) Mol .wt./6 (4) Mol. wt./2

53. Molecular weight of $KBrO_3$ is M. What is its equivalent weight, if the reaction is :
$BrO_3^- \rightarrow Br^-$ (acidic medium)
(1) M (2) M/4 (3) M/6 (4) 6M

54. In the reaction : $A^{-n_2} + xe^- \rightarrow A^{-n_1}$, here x will be
(1) $n_1 + n_2$ (2) $n_2 - n_1$
(3) $n_1 - n_2$ (4) $n_1 . n_2$

55. What would be the equivalent weight of the reductant in the reaction :
$[Fe(CN)_6]^{-3} + H_2O_2 + 2OH^- \rightarrow 2[Fe(CN)_6]^{4-} + 2H_2O + O_2$
[Given : Fe = 56, C = 12, N = 14, O = 16, H = 1]
(1) 17 (2) 212 (3) 34 (4) 32

56. Equivalent weight of FeC_2O_4 in the change : $FeC_2O_4 \rightarrow Fe^{3+} + CO_2$ is :
(1) M/3 (2) M/6 (3) M/2 (4) M/1

57. The number of mole of oxalate ions oxidised by one mole of MnO_4^- is :
(1) 1/5 (2) 2/5 (3) 5/2 (4) 5

58. In a reaction 4 mole of electrons are transferred to one mole of HNO_3 when it acts as an oxidant. The possible reduction product is:
(1) (1/2) mole N_2 (2) (1/2) mole N_2O
(3) 1 mole of NO_2 (4) 1 mole NH_3

59. The equivalent weight of $MnSO_4$ is half of its molecular weight when it is converted to :-
(1) Mn_2O_3 (2) MnO_2
(3) MnO_4^- (4) MnO_4^{-2}

60. In the following change,
$3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$
If the atomic weight of iron is 56, then its equivalent weight will be :-
(1) 42 (2) 21 (3) 63 (4) 84

61. $Cr_2O_7^{-2} + I^- + H^+ \rightarrow Cr^{+3} + I_2 + H_2O$
The equivalent weight of the reductant in the above equation is :– (At. wt. of Cr=52, I=127)
(1) 26 (2) 127 (3) 63.5 (4) 10.4

62. How many moles of $KMnO_4$ are reduced by 1 mole of ferrous oxalate in acidic medium:-
(1) $\frac{1}{5}$ (2) $\frac{5}{3}$ (3) $\frac{1}{3}$ (4) $\frac{3}{5}$

REDOX REACTIONS

63. Which one of the following is a redox reaction?
(1) $H_2 + Br_2 \rightarrow 2HBr$
(2) $2NaCl + H_2SO_4 \rightarrow Na_2SO_4 + 2HCl$
(3) $HCl + AgNO_3 \rightarrow AgCl + HNO_3$
(4) $NaOH + HCl \rightarrow NaCl + H_2O$

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64. Which of the following is not a redox change ?
(1) $2H_2S + SO_2 \rightarrow 2H_2O + 3S$
(2) $2BaO + O_2 \rightarrow 2BaO_2$
(3) $BaO_2 + H_2SO_4 \rightarrow BaSO_4 + H_2O_2$
(4) $2KClO_3 \rightarrow 2KCl + 3O_2$

65. In the reaction, $Cl_2 + OH^- \rightarrow Cl^- + ClO_4^- + H_2O$, chlorine is :
(1) Oxidised
(2) Reduced
(3) Oxidised as well as reduced
(4) Neither oxidised nor reduced

66. Which is a redox reaction :
(1) $2CuI_2 \rightarrow CuI + I_2$
(2) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$
(3) $NH_4Cl + NaOH \rightarrow NH_3 + NaCl + H_2O$
(4) $Cr_2(SO_4)_3 + 6KOH \rightarrow 2Cr(OH)_3 + 3K_2SO_4$

67. Which of the following example does not represent disproportionation -
(1) $MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$
(2) $2H_2O_2 \rightarrow 2H_2O + O_2$
(3) $4KClO_3 \rightarrow 3KClO_4 + KCl$
(4) $3Cl_2 + 6NaOH \rightarrow 5NaCl + NaClO_3 + 3H_2O$

68. The decomposition of $KClO_3$ to KCl and O_2 on heating is an example of :
(1) Intermolecular redox change
(2) Intramolecular redox change
(3) Disproportionation or auto redox change
(4) Comproportionation

69. Which of the following change represents a disproportionation reaction (s) :
(1) $Cl_2 + 2OH^- \rightarrow ClO^- + Cl^- + H_2O$
(2) $Cu_2O + 2H^+ \rightarrow Cu + Cu^{2+} + H_2O$
(3) $2HCuCl_2 \xrightarrow[\text{Water}]{\text{dilution with}} Cu + Cu^{2+} + 4Cl^- + 2H^+$
(4) All of the above

70. How many electrons should X_2H_4 liberate so that in the new compound X shows oxidation number of -½ (E.N. X > H)
(1) 10 (2) 4 (3) 3 (4) 2

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71. Which one of the following is not a redox reaction :-

(1) $CaCO_3 \rightarrow CaO + CO_2$

(2) $2H_2 + O_2 \rightarrow 2H_2O$

(3) $Na + H_2O \rightarrow NaOH + \frac{1}{2}H_2$

(4) $MnCl_3 \rightarrow MnCl_2 + \frac{1}{2}Cl_2$

72. In the reaction -

$MnO_4^- + SO_3^{2-} + H^+ \rightarrow SO_4^{-2} + Mn^{+2} + H_2O$

(1) MnO_4^- and H^+ both are reduced

(2) MnO_4^- is reduced and H^+ is oxidised

(3) MnO_4^- is reduced and SO_3^{2-} is oxidised

(4) MnO_4^- is oxidised and SO_3^{2-} is reduced

73. $I_2 + KI \rightarrow KI_3$

In the above reaction:-

(1) Only oxidation taken place

(2) Only reduction takes place

(3) Both the above

(4) Neither oxidation nor reduction

74. Which of the following reaction represents the oxidising behaviour of H_2SO_4 :-

(1) $2PCl_5 + H_2SO_4 \rightarrow 2POCl_3 + 2HCl + SO_2Cl_2$

(2) $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

(3) $NaCl + H_2SO_4 \rightarrow NaHSO_4 + HCl$

(4) $2HI + H_2SO_4 \rightarrow I_2 + SO_2 + 2H_2O$

75. Select the example of disproportionation reaction

(1) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$

(2) $NH_4NO_3 \rightarrow N_2O + 2H_2O$

(3) $4H_3PO_3 \rightarrow PH_3 + 3H_3PO_4$

(4) $AgCl + 2NH_3 \rightarrow Ag(NH_3)_2Cl$

76. Which of the following reaction involves oxidation & reduction :-

(1) $NaBr + HCl \rightarrow NaCl + HBr$

(2) $HBr + AgNO_3 \rightarrow AgBr + HNO_3$

(3) $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

(4) $H_2 + Br_2 \rightarrow 2HBr$

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77. The reaction

$2K_2MnO_4 + Cl_2 \rightarrow 2KMnO_4 + 2KCl$

is an example of

(1) Redox

(2) Reduction only

(3) Neutralization

(4) Disproportionation

78. Which of the following reaction involves neither oxidation nor reduction :–

(1) $CrO_4^{2-} \rightarrow Cr_2O_7^{2-}$ (2) $Cr \rightarrow CrCl_3$

(3) $Na \rightarrow Na^+$ (4) $2S_2O_3^{2-} \rightarrow S_4O_6^{2-}$

79. $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$

Zn undergoes –

(1) Reduction

(2) Oxidation

(3) Both oxidation and reduction

(4) Neither oxidation nor reduction

BALANCING OF REDOX REACTIONS

80. Balance the following given half reaction for the unbalanced whole reaction :

$CrO_4^{2-} \rightarrow CrO_2^- + OH^-$ is :

(1) $CrO_4^- + 2H_2O + 3e^- \rightarrow CrO_2^- + 4OH^-$

(2) $2CrO_4^{-2} + 8H_2O \rightarrow CrO_2^- + 4H_2O + 8OH^-$

(3) $CrO_4^{-2} + H_2O \rightarrow CrO_2^- + H_2O + OH^-$

(4) $3CrO_4^{-2} + 4H_2O + 6\,e^- \rightarrow 2CrO_2^{-1} + 8OH^-$

81. Choose the set of coefficients that correctly balances the following equation :

$x\,Cr_2O_7^{2-} + yH^+ + z\,e^- \rightarrow a\,Cr^{+3} + bH_2O$

	x	**y**	**z**	**a**	**b**
(1)	2	14	6	2	7
(2)	1	14	6	2	7
(3)	2	7	6	2	7
(4)	2	7	6	1	7

82. In the reaction:

$MnO_4^- + xH^+ + ne^- \rightarrow Mn^{2+} + yH_2O$

What is the value of n :

(1) 5 (2) 8 (3) 6 (4) 3

83. The number of electrons required to balance charge in the following equation –

$MnO_4^- + 2H_2O \longrightarrow MnO_2 + 4OH^-$ is

(1) 5 (2) 4 (3) 3 (4) 2

84. $2KMnO_4 + 5H_2S + 6H^+ \rightarrow 2Mn^{2+} + 2K^+ + 5S + 8H_2O$

In the above reaction, how many electrons would be involved in the oxidation of 1 mole of reductant?

(1) Two (2) Five (3) Ten (4) One

85. The value of *n* in :

$MnO_4^- + 8\ H^+ + ne^- \rightarrow Mn^{2+} + 4\ H_2O$ is

(1) 5 (2) 4 (3) 3 (4) 2

86. For the redox reaction

$Zn + NO_3^- \rightarrow Zn^{2+} + NO_4^+$

in basic medium, coefficients of Zn, NO_3^- and OH^- in the balanced equation respectively are :

(1) 4, 1, 7 (2) 7, 4, 1

(3) 4, 1, 10 (4) 1, 4, 10

87. In the balanced equation-

$[Zn + H^+ + NO_3^- \rightarrow NH_4^+ + Zn^{+2} + H_2O]$

coefficient of NH_4^+ is:-

(1) 4 (2) 3 (3) 2 (4) 1

88. In the balanced equation

$MnO_4^- + H^+ + C_2O_4^{2-} \rightarrow Mn^{2+} + CO_2 + H_2O$, the moles of CO_2 formed are :-

(1) 2 (2) 4 (3) 5 (4) 10

89. In the following reaction the value of 'X' is

$H_2O + SO_3^{2-} \rightarrow SO_4^{2-} + 2H^+ + X$

(1) $4e^-$ (2) $3e^-$ (3) $2e^-$ (4) $1e^-$

90. The number of electrons required to balance the following equation are:

$NO_3^- + 4H^+ \rightarrow 2H_2O + NO$

(1) 2 on right side (2) 3 on left side

(3) 3 on right side (4) 5 on left side

EXERCISE-I (Conceptual Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	2	3	2	3	3	2	1	3	3	4	1	2	2	1	1
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	2	1	1	4	3	3	4	1	1	1	4	3	4	1	1
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	1	4	3	4	4	4	1	2	1	1	2	2	2	2	1
Question	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Answer	2	1	3	1	4	1	3	3	3	1	1	3	2	2	2
Question	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Answer	2	4	1	3	3	1	1	2	4	3	1	3	3	4	3
Question	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Answer	4	1	1	2	1	2	1	3	1	1	3	4	4	3	2

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Exercise - II (Previous Year Questions) AIPMT/NEET

AIPMT 2009

1. Oxidation numbers of P in PO_4^{3-}, of S in SO_4^{2-} and that of Cr in $Cr_2O_7^{2-}$ are respectively :-

(1) –3, +6 and +6 (2) +5, +6 and +6

(3) +3, +6 and +5 (4) +5, +3 and +6

AIPMT Pre. 2012

2. When Cl_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from:

(1) Zero to –1 and zero to +3

(2) Zero to +1 and zero to –3

(3) Zero to +1 and zero to –5

(4) Zero to –1 and zero to +5

3. In which of the following compounds, nitrogen exhibits highest oxidation state?

(1) N_3H (2) NH_2OH (3) N_2H_4 (4) NH_3

AIPMT 2014

4. The reaction of aqueous $KMnO_4$ with H_2O_2 in acidic conditions gives :-

(1) Mn^{4+} and O_2 (2) Mn^{2+} and O_2

(3) Mn^{2+} and O_3 (4) Mn^{4+} and MnO_2

RE-AIPMT 2015

5. Assuming complete ionization, same moles of which of the following compounds will require the least amount of acidified $KMnO_4$ for complete oxidation?

(1) FeC_2O_4 (2) $Fe(NO_2)_2$

(3) $FeSO_4$ (4) $FeSO_3$

NEET-II 2016

6. Hot concentrated sulphuric acid is a moderately strong oxidizing agent. Which of the following reactions does not show oxidizing behaviour ?

(1) $C + 2H_2SO_4 \rightarrow CO_2 + 2SO_2 + 2H_2O$

(2) $CaF_2 + H_2SO_4 \rightarrow CaSO_4 + 2HF$

(3) $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$

(4) $3S + 2H_2SO_4 \rightarrow 3SO_2 + 2H_2O$

NEET(UG) 2018

7. For the redox reaction

$MnO_4^- + C_2O_4^{2-} + H^+ \longrightarrow Mn^{2+} + CO_2 + H_2O$

the correct coefficients of the reactants for the balanced equation are

	MnO_4^-	$C_2O_4^{2-}$	H^+
(1)	16	5	2
(2)	2	5	16
(3)	2	16	5
(4)	5	16	2

NEET(UG) 2019

8. Which of the following reactions are disproportionation reaction ?

(a) $2Cu^+ \rightarrow Cu^{2+} + Cu^0$

(b) $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$

(c) $2KMnO_4 \xrightarrow{\Delta} K_2MnO_4 + MnO_2 + O_2$

(d) $2MnO_4^- + 3Mn^{2+} + 2H_2O \rightarrow 5MnO_2 + 4H^{\oplus}$

Select the **correct** option from the following :-

(1) (a) and (b) only (2) (a), (b) and (c)

(3) (a), (c) and (d) (4) (a) and (d) only

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9. What is the change in oxidation number of carbon in the following reaction ?

$CH_4(g) + 4Cl_2(g) \rightarrow CCl_4(l) + 4HCl(g)$

(1) 0 to –4 (2) +4 to +4

(3) 0 to +4 (4) –4 to +4

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10. The equivalent weight of the salt $KHC_2O_4.H_2C_2O_4.4H_2O$ used as reducing agent is

(1) $\frac{\text{Mol.wt}}{1}$ (2) $\frac{\text{Mol.wt}}{2}$

(3) $\frac{\text{Mol.wt}}{3}$ (4) $\frac{\text{Mol.wt}}{4}$

11. Which of the following reactions is the metal displacement reaction ? Choose the right option.

(1) $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$

(2) $Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$

(3) $Fe + 2HCl \rightarrow FeCl_2 + H_2\uparrow$

(4) $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2\uparrow$

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12. Which of the following reactions is the metal displacement reaction ? Choose the right option.

(1) $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$

(2) $Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$

(3) $Fe + 2HCl \rightarrow FeCl_2 + H_2\uparrow$

(4) $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2\uparrow$

13. Which of the following reactions is a decomposition redox reaction ?

(1) $2\ Pb(NO_3)_2(s) \rightarrow 2\ PbO(s) + 4\ NO_2(g) + O_2(g)$

(2) $N_2(g) + O_2(g) \rightarrow 2\ NO(g)$

(3) $Cl_2(g) + 2OH^-(aq) \rightarrow ClO^-(aq) + Cl^-(aq) + 4H_2O(\ell)$

(4) $P_4(s) + 3OH^-(aq) + 3H_2O(\ell) \rightarrow PH_3(g) + 3H_2PO^-_2(aq)$

EXERCISE-II (Previous Year Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13
Answer	2	4	1	2	3	2	2	1	4	4	2	4	1

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Exercise – III (Analytical Questions) Master Your Understanding

1. In the reaction given below :

(A) $H_2S_{(g)} + Cl_{2(g)} \longrightarrow 2HCl_{(g)} + S_{(s)}$

(B) $3Fe_3O_{4(s)} + 8Al_{(s)} \longrightarrow 9Fe_{(s)} + 4Al_2O_{3(s)}$

The related statements are :

Statement-I : In (A) H_2S is oxidised because a more electronegative element Cl_2 is added to hydrogen.

Statement-II : In (B) Aluminium is oxidised because oxygen is added to it.

Statement-III : In (B) Ferrous ferric oxide is reduced.

Statement-IV : Individual oxidation or reduction reactions never occur but redox reactions occur.

The correct one is :

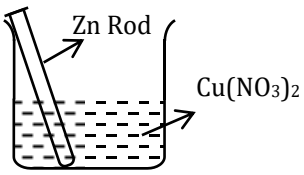
(1) Statement-I, II, III and IV are correct

(2) Statement-I, II are correct but III and IV are incorrect

(3) Statement-I, II, III and IV are incorrect

(4) Statement-II, IV are incorrect but I and III are correct

2.



(Zn rod in $Cu(NO_3)_2$ solution)

Statement-I: Zn looses electron to form Zn^{2+} so Zn is getting oxidised.

Statement-II: Cu acts as reducing agent.

The correct statement is :

(1) Statement-I is correct but statement-II is wrong

(2) Statement-I is incorrect but statement-II is correct

(3) Statement-I and statement-II both are correct

(4) Statement-I and statement-II both are incorrect

3. Match the following column-I and column-II :

Column-I		Column-II	
(a)	H_2S	(p)	Oxidising agent
(b)	$KMnO_4$	(q)	Reducing agent
(c)	H_2O_2	(r)	Can act as both oxidising and reducing agent

(1) (a-r), (b-p), (c-q) (2) (a-q), (b-p), (c-r)

(3) (a-p), (b-q), (c-r) (4) (a-r), (b-q), (c-p)

4. For Cs, Ne, I and F the following statements are given :

(A) F generally exhibits negative oxidation state in compounds

(B) Cs exhibits only positive oxidation state in compounds.

(C) Ne exhibits the (+)ve and (-)ve oxidation state both

(D) I exhibits the (+)ve and (-)ve oxidation state both

From above the incorrect statement is/are :

(1) A, B and C only (2) B, C and D only

(3) C only (4) A, B and D only

5. **Assertion (A) :** In a displacement reaction an ion or an atom in a compound is replaced by an ion or an atom of another element : $x + yz \rightarrow y + xz$.

Reason (R) : Displacement reactions fit into two categories one is metal displacement other is non metal displacement.

The correct one is :

(1) A is correct but R is false

(2) Both A and R are correct and R is correct explanation A

(3) Both A and R are correct but R is not correct explanation of A

(4) A is false but R is correct

6. Given below are two statements:

Statement-I : Fractional oxidation number is unconvincing to us because electrons are never shared or transferred in fraction.

Statement-II : Fractional oxidation state is the average oxidation state of element.

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The correct one is :
(1) Both statement-I and statement-II are correct
(2) Statement-I is correct but statement-II is wrong
(3) Statement-I is wrong but statement-II is correct
(4) Both statement-I and statement-II are wrong

7. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion :- Oxidation state of Hydrogen is +1 in H_2O while –1 in CaH_2.

Reason :- CaH_2 is a metal hydride and for metal hydrides, hydrogen is assigned the oxidation number of +1.

In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**.
(2) **(A)** is correct but **(R)** is not correct.
(3) **(A)** is not correct but **(R)** is correct.
(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**.

8. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion :- The average oxidation no. of sulphur in $Na_2S_4O_6$ is 2.5

Reason :- Two S-atoms are not directly linked with O-atoms.

In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A).**
(2) **(A)** is correct but **(R)** is not correct.
(3) **(A)** is not correct but **(R)** is correct.
(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A).**

9. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion :- The decomposition of H_2O_2 to form H_2O and O_2 is an example of disproportionation reaction.

Reason :- The oxygen of peroxide is in –1 oxidation state and it is converted to zero oxidation state in O_2 and –2 oxidation state in H_2O.

In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**.
(2) **(A)** is correct but **(R)** is not correct.
(3) **(A)** is not correct but **(R)** is correct.
(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**.

10. From the following options :
(A) Oxidation state of Br in Br_3O_8 is +10/3
(B) Oxidation state of C in C_3O_2 is +1
(C) Oxidation state of S in $S_4O_6^{2-}$ is +2.5
(D) Oxidation state of H in metal hydrides is –1
(E) Oxidation state of P in P_4 is –1/4
The correct option is :
(1) A, B, C, D and E one correct
(2) A, C, D and E are correct
(3) B, C, D and E are correct
(4) C and D are correct

EXERCISE-III (Analytical Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10
Answer	1	1	2	3	3	1	2	1	4	4